of yellowish clay marle, mixed with the fragments of shells belonging to the genera cerites, trochus, mactra, venus, cardium, &c., and the palate of a ray analogous to the sea eagle. Almost all the succeeding beds exhibit fossil sea shells, and the strata immediately below the clayey sand contains two pretty distinct oyster beds; this is succeeded by a stratum of whitish marle without shells, after which comes a second very thick oyster bed, but subdivided into several distinct beds, brown, smaller, and thinner than the preceding ones. The formation of gypsum is very often terminated by a mass of clayey sand without shells.

Of the animal remains found in the gypsum beds, Cuvier found the remains of three kinds of herbivorous animals approaching the nature of the rhinocerous, the hog, and the tapir.

The chemical character of gypsum is, generally speaking, the same in all the sub-species. It is almost infusible without addition, but the sparry gypsum undergoes partial decomposition under the blow-pipe. In a still more intense heat it appears to lose a great part of its sulphuric acid, fusing into a white glass, which soon falls into a white powder. It requires 500 times its weight of water to render it soluble, does not effervesce with acids, nor is it decomposed by any of them; it is dissolved on being boiled with fixed alkalies or barytes.

When converted into plaster, it is in considerable request for works of art, the coarser sorts are employed, with the admixture of common limestone, for cements. The gypsum which naturally contains carbonate of lime makes a very good cement, but that which contains clay and sands is of inferior quality. Gypsum is extensively used by the modeller, in scagliola, and for a variety of useful and ornamental purposes.

On the river Wolga, in Russia, the burning of gypsum constitutes one of the chief occupations of the peasantry. They calcine it on grates of wood, reduce the plaster to a powder, pass it through a sieve, and form it into small round cakes; in times of scarcity, they have mixed it with flour as an article of food, but its deleterious effects must be equally fatal as the famine itself; even the manufacturers of plaster of Paris suffer much from its pernicious effects.

The common way of burning this stone into marble is said to be too slight to give it all the hardness it is capable of. It is reported that a greater degree of heat renders it much superior in hardness; and, it is said, that the artificial marble, with which the whole palace of Munich is adorned, and which is esteemed more than marble, for which it is mistaken by all that see it, is made of the common gypsum, first burned in the ordinary way, and afterwards put on the fire again in a copper vessel, and suffered to boil as it will, like water, for a long time. When this boiling ceases of itself, the matter is taken out, and common colours such are as used in painting are mixed with it in various proportions, which, on the wetting it with water and working it in the common manner of plaster of Paris, diffuse themselves, and imitate the veins of natural marble.

(To be continued.)

THE NEW SYSTEM OF LOCOMOTION PROPOSED BY M. ANDRAUD.

(Communicated to the French Academy of Science, on the 11th instant, by M. Arago.)

The system consists of a long flexible air-tight tube, placed between the two rails on the whole length of the line. At the extremities of this tube are reservoirs filled with compressed air. A kind of flatting-mill is fixed at the head of the first carriage of the train, and the tube is pressed gently between the two rollers. This is the whole of his apparatus. When the train is to be set in motion, one of the reservoirs of compressed air is put into communication with the tube, which swells, and the air, meeting with the obstacle of the rollers, acts upon the mill, which performs the office of a piston, and the train is impelled with more or less rapidity, as the pressure upon the air is more or less violent, and according to the diameter of the tube. In this process there is, of course, no engine, and the carriages are carried with considerable rapidity up any moderate elevation, and can be made to ascend at a lower rate the highest hills.

THE NEW CLOCK OF STRASBURG.

What brings the greatest number of strangers to Strasburg Cathedral is the clock. On Sundays and holydays, scores of country people sit on the flagged floor in front of this clock, waiting till the hour of noon shall set all its machinery in motion, and a notice is fixed to the walls, that they who go to see the clock shall depart by one particular door, to prevent confusion in the church. The present clock is new, and much more perfect than the old one, famous for many centuries, which may still be seen in a building near the cathedral.

The great clock of Strasburg consists of a tower, rising to an altitude of more than sixty feet, and flanked by two smaller towers, one of which contains a staircase, by which the different parts of the movement may be approached. The whole erection is inclosed by an iron railing. It is very handsomely decorated, and though the motions of the puppets are what attract the majority of visitors, we will first consider the scientific part of this machine, which is unique. The present astronomical clock was begun June 24, 1838, and was first set in motion on Sunday, October 2, 1842. Immediately in front of the clock is a celestial globe, rectified to the latitude of Strasburg, shewing, by its revolution, sidereal time, and the stars which are above the horizon at any moment. More than 5,000 stars are laid down on this globe. Behind the globe, and on the body of the clock, is a circle containing the calendar. A small statue of Apollo, on the right of this circle, points with an arrow to the actual day. A figure of Diana on the left corresponds to the former. The circle revolves on its axis, bringing a new day to the arrow of Apollo every twenty-four hours, and is so arranged as to shew not only the fixed feasts, but the moveable ones, and the intercalary day of leap-year. In the centre of this circle is a portion of a hemisphere of the terrestrial globe, shewing, by its revolution, apparent time. This division of the machine shews also the time of sunrise and sunset—true time—the true diurnal motion of the moon round the earth, or its true right ascension and time of southing—the phases and eclipses of the moon. As this circle is drawn within a square, triangular spaces are left, which are filled with figures emblematical of the four great monarchies. The clock also shews the year, the solar cycle, the golden number, the Roman indiction, the dominical letter, the epacts, and the feast of Easter. All the above indications are arranged for the period of 25,000 years. Above the circle of the calendar a very elegant contrivance shews the days of the week. Seven chariots, driven by the heathen gods to which the days were dedicated by the Romans, pass round in a circle, one only being visible at a time. The name of the day is written on the wheel of the chariot. Over this is an ordinary clock-dial, the machinery attached to which strikes the quarters, and turns an hour-glass at the end of every hour. Higher still is a planetarium, and still higher a moon, half silvered and half painted black, which, by revolving, shews the actual appearance of the moon at the time. A figure of death, armed with a scythe, stands in a recess above the moon, and at each quarter of an hour one of the personifications of the four ages of man passes before him, and strikes on a bell the requisite number of blows. Thus an infant strikes the first quarter, a youth (a hunter) the second, a man (a warrior) the third, an old man the fourth. These figures, in passing, move their arms and legs as if walking. The quarters are also struck by Death with the bone which he holds in his hand. The highest compartment is occupied by a figure of the Saviour, surrounded by his twelve apostles. Every day at noon, when death has sounded the hour, the apostles march round their master, each as he comes before him turning and making an inclination, as he receives the benediction; during this time a cock, placed on the summit of one of the smaller towers, crows, and claps his wings. There are several other figures, paintings, and decorations, which have not been mentioned here. The machinery of the clock is of a high degree of finish, and many of the contrivances are of beautiful simplicity. The whole is freely shewn and explained by an intelligent young man, who really understands his subject, and does not parrot a monotonous drawl learned by rote, like the greater number of exhibitors. The name of the maker and contriver of this curious piece of mechanism is J. B. Schwilgue.—*Sketches in Rhineland.*

[The whole, with its admixture of science and trumpery, paganism and Christianity, forms perhaps one of the drollest compounds on earth.—Ed.]

ON THE CONSTRUCTION OF RIVER PIERS.

The numerous, and frequently fatal, accidents which have occurred of late years at the different landing-places for steam-boat passengers, on the banks of the Thames, have at last drawn public attention to the necessity of enforcing strong discipline in the management of them, and of exercising some adequate control over their construction. The Navigation Committee have approached this subject with zeal and determination; and have had submitted to their attention many plans well calculated to meet this expanding evil. It will be, however, well to bear in mind that the subject has before now been allowed to repose from year to year; the diminution of traffic being too readily interpreted into a disappearance of the danger.

There are two ways of approaching this most desirable work of reformation: the one, by insisting authoritatively upon a satisfactory revision of the existing piers; by which, whatever tended to danger, or inconvenience little short of danger, should be removed, and safety and accommodation secured to the passengers;—the other, by vesting the entire control of the piers, as to locality, structure, and repairs, in the hands of those members of the municipal authorities within whose duties it could most aptly be placed. To the latter of these plans it may be objected that limits would be thereby set to the enterprise of the individuals or companies engaged in the steam-boat traffic; that vested interests are involved to a large amount, which must suffer deeply by so restrictive a system. To this we may answer, that the public have no other concern in the matter than that of insuring their own safety and convenience, to which the pier proprietors seem to have been hitherto indifferent. So long as these two prime wants were attended to; so long as one could hope to set his foot upon the planks of the barges, or dummies, without the prospect of perforating them; so long as it was unnecessary for the hands to be called to the pumps every tide; so long as one felt secure that the contending advocates of rival boats would not make a drawn game of their struggle for patronage, by immersing their voyager in the mimic surge created by the impatient paddles; so long, perhaps, the public might be presumed to be contented with the rude attempts at accommodation which the landing-places of the most wealthy city in the world presented. But this inert security has passed away. Time and "certain politic rats" have gnawed away at the dummies—the hammer and nail knows no rest—the arm of the pumper waxes faint—mayors and aldermen rise on the judgment-seat, and pronounce emphatically that "something must be done."

This annual step having been made some months back, we were prepared to find that the customary slumber had come over the civic authorities. We were consequently gratified at perceiving in the papers at the beginning of October, an extract from a report of the Navigation Committee, in which it was stated that Mr. Walker had submitted a plan for erecting a pier at Blackfriars'-bridge, available for the public service, at the *moderate cost of* 2,200*l.* Now, save that Blackfriars'-bridge was recently the scene of a most fatal accident, we know of no ground of preference upon which it can be deemed imperative to expend the sum of 2,200*l.* upon its landing-place or pier. There are, between London-bridge and Westminster, at least ten piers; each of which, although not so distinguished by casualty, might put in claims to attention, upon some one or more of the grounds which we have just stated. Here then should be an outlay of 22,000*l.*; for at each landing-place it may be presumed the passengers have an equal right to protection. Is such an expenditure necessary? Has due caution been exercised in the selection of the proposed pier? We are assured by the report,

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